

FIG. 1 - 1

VAP-1 amino acid sequence (SEQ ID NO:1)

MAVLAVLLACLERAVAQTFGCSNTKINDQARKMIFYDAHNDARRSMAKGLE
PNKCGCLLSGGKNVYELNWDCEMEAKAQEWADGCPSSFQTFDPTWGQNYATYM
GS1ADPLPYASMAVINGWWSEIRTVGLTDPDNKYTNSAMFRANMANGKASAFG
CAYALCAGKLSINC1YNKIGYMTNAIIYEKGDACTSDAECTTYSDSQCKNGLCYK
APQAPVVEFTMCPSVTDQSDQARONFLDTHNKLRTSLAKGLEADGIAAGAFAP
MAKQMPKLVKYSCTVEANARTWAKGCLYQHGSTSAQRPGLGENLYMISINNMP
K1QTAEDSSKAWWSELKDFGVGSDNILTQAVFDRGVGHYTQMAWEGTTEIGCF
VENCPTFTYSVCQYGPAGNYMNQLIYTKGSPCTADADCPGTQTCVVAEALCV1P

vap-1 cDNA nucleotide sequence (SEQ ID NO:2)

ATGGCGGTATTAGCAGTGGTACTACTTACCGATGCCATTGGAGAGGGTTG
CACAGACGTTGGCTCTAACACCAAGATCAATGACCAGGCTCGTAAGAT
GTTCTATGATGCTCACAAATGCAAGACGAAGCATGGCTAAAGGGCTTGA
CCAACAAGGTGGGACTCTATCTGGTGGAAAGAATGTTATGAATTGAAATT
GGGATTGGAGATGGAAGCAAAGCTCAGGAATGGCAGACGGATGTC
GCTCTTCCAGACATTGATCCAACATGGGGCAGAACTACGGCAGCTACAT
GGGATCGATGCTGATCCGCTCCATACGGCTCCATGGCTTAATGGGTGGT
GGTCGGAAATTAGAACCGTAGGACCTACGGATCCCTGATAACAAGTACAA

To Fig. 1-2

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FIG. 1-2

FROM Fig. 1-1

CAGTGCAATGTTCCGATTTCGCTAATAATGGCAAATGGTAAAGCTTCAGCTTTG
GATGTCATACGGGTTGGCAGGAAACTATCCATCAATTGCATTACAA
CAAGATAGGATACATGACCAATGCTATCATTTATGAAAAGGAGATGCCCTGT
ACCACTGACCCCTGAATGCCACCTACTCAGACTCACAATGCCAAAACGGTC
TTTGCTATAAGCCACCTCAAGCTCCAGTCAGTGGACTTACAATGTGCCCT
TCGGTCACGGACCGTGGATCAGGGCGCTCAAAACTTCTGGACACCCATA
ACAATTGCGTACAAGCCTGCCAAGGGACTTGAAAGCTGATGGAATTGCCGC
TGGAGCAATTGCACCAATGCCAAGCAAATGCCAAAAGCTGGTAAAATACAGC
TGCACAGTTGAAGCAAACGCCAGAACATGGCAAAGGATGCCATTACAGC
ATTCAACAGGCCACAGAGACCAGGACTCGGTGAAAATCTTATGATCAG
CATTAACAAACATGCCTAAATTCAAACCCGGAGGACTCCAAAGGCTTGG
TGGTCCGAGTTGAAAGACTCGGAGTCGGTTCTGACAACATTCTGACCCAAAG
CAGTTTGTATCGTGGCGTTGGACATTACACACAAATGGCATGGAAAGGAAC
TACTGAAATTGGATGTTTGTGGAAATTGTCACATTCACTTATTCCGTAT
GCCAAATATGGTCCAGGGAAACTACATGAACCAACTAATCTATACCAAGGG
CTCACCATGCACAGCTGACGCCGATTGCCAGGAACCCAGACATGCAGTGTGTC
GCTGAAGCATTGTTATCCCTTAGTAAATTCTATGCAACTCTTTGAAAG
GTCATAATAATGCAAATAAAAATAAAAAA

To Fig. 1-3



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FIG. 1-3

FROM Fig. 1-2

VAP-2 amino acid sequence (SEQ ID NO:3)

MNVVLSAVTFLIFRYAQTVNIEGGGNDEELLEQNVWNDVDDKVVVEALGGLDD
ELLTEHVCNKSTITQLQQEILTTHNELRSSLAFGKQRNKRGMLNGARNMYKLD
WDCELASLAANWSTSCPQHQHMPQSVLGSNAQLFKRFYFYFDGHDSTVHMRNA
MKYWWQQGEEKGNEDQKNRFYARRNYFGWANMAKGKTYRVGCSYIMCGDG
ESALFTCLYNEKAQCEKEMIYENGKPCCEDKDCFTYPGSKCLVPEGLCQAPSVM
KDDGGSFQCDNSLVSVDVTRNFTLEQHNFYRSRLAKGFEWNGETNTSQPKASQM
IKMEYDCMLERFAQNWANNCVFAHSAHYERPNQGQNLYMSFFSNPDPRSLIHT
AVEKWWQELEEFGTPIDNVLTPELWDLKGKAIGHYTQMAWDRTYRLGCGIANC
PKMSYYVCHYGPAGNRKNNKIYEIGDPCEVDDDCP1GTDCEKTTSLCVISK

vap-2 cDNA nucleotide sequence (SEQ ID NO:4)

To Fig. 1-4



FIG. 1-4

FROM Fig. 1-3

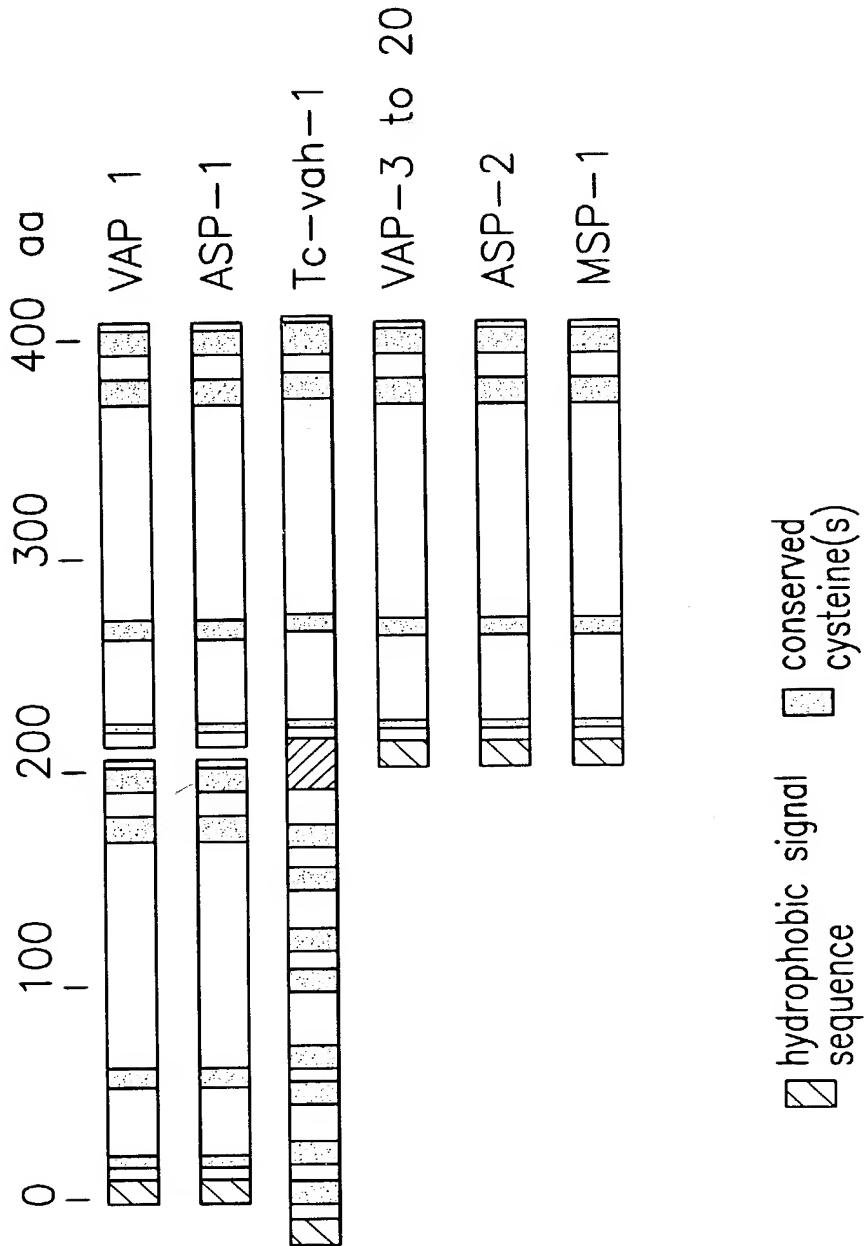
TAAGCGTTCTATTCTTGTGGCACGACTCTACTGTACATATGCCAA
ACCGCATGAAGTATTGGCAGGAAGGTGAAGAAAAAGCAATGAGGATC
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AAAAGGAAACATATCCGAGTGGATGCTCGTATTATGTGGCCGACGGT
GAATCTGCACTTTCACTTGTCTTATAACGAAAAGCCAATGCCAAAAG
AAATGATTACGAAAATGGAAAACCCCTGCTGTGAGGATAAGACTGTTTCAC
ATATCCAGGATCAAAATGTTTAGTACCTGAAGGATTATGTCAGGCCCTCTA
TGGTAAGGGATGATGGAGGAAGTTCCAAATGTGATAACTCCCTGTGAGA
TGTCACCCCAATTCACTTGGAGCAACACAATTAGATCTCGTCTTG
CAAAGGTTTGAATGGAAACAAACACTTCCAGCCAAAGGCTAG
TCAAATGATCAAAATGGAGTATGACTGCATGTTGAACGGTTGCACAAAC
TGGCAAATAATTGGCTTTGCACACTGGCACATTACGAAAGACCGAATC
AGGGTCAGAATCTACATGAGTTCTCAAAACCTGATCCCTAGAAGCCTT
ATACATACGGCCGTCGAGAAGTGGCAGGAATTGGAGGTTCGGTACTC
CAATTGATAACCTTCTGACACCCCAATTGGGATTGGGATCGTACTACCGTCT
AGGACATTACACTCAGATGGCCTGGGATCGTACTACCGTCTGGGAA
TCGCCAAACTGTCCGAAAGATGTGGTACGTGGTTGTCACTATGCCAGCAGG
CAACAGAAAGAACATAAAATCTATGAAATGGGATCCTTGGAAAGTCGAT
GATGATTGCCGATTGGAACAGATTGTGAAAAGACAACCTTATGTTGAT
CTCAAAATAA

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FIG.2

Schematic diagram of nematode venom allergen protein domains



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FIG.3-1



CLUSTAL W Alignment of VAP-1, VAP-2, and selected other nematode VA proteins.

VAP-1N	1	-----	MAVLAVVLLACLERA	V	AQTFG	22										
VAP-1C	1	-----	PQAPV	VET	FTM	11										
VAP-2N	1	-----	1MNVVVL	SAVTFL	I	FRYAQTVNIEGG	GND	ELLE	QNVW	NDV	DD	V	EA	LL	TEHV	60
VAP-2C	1	-----	SFQ	3												
ASP-1N	1	-----	MFSPV	IVSV	IFTI	AFC	DA	SPARD	GFG	26						
ASP-1C	1	-----	DVP	ET	NQQ	8										
VAP-3	1	-----	MNY	LLL	V	VALAVG	13									
MSP-1	1	-----	MSNKL	I	ISIL	LTT	14									

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VAP-1N	23	CSNTKIN	---	DQARK	KMFY	DAHND	ARRSMA	KGL	EPN	---	KCG	LLSGG	KNVY	E	LN	-WDC	CE	MEA	76		
VAP-1C	12	CPSVT	-DQS	DQAR	QNFL	DTHNKL	RTSL	AKG	LEADG	I	AAGA	FAPMA	KQMPK	L	VKY	SCT	VEA	70			
VAP-2N	61	CNKST	--	IT	QLQQE	II	LT	QLQ	GEI	IL	AF	GKQRN	--	KRGL	MNG	ARN	MY	KLD	-WDC	ELAS	114
VAP-2N	4	CDNSLV	--	SDV	TRNFTL	EQ	HNFY	RSRL	AKG	FEW	NG	-ET	NTSQPKA	SQMI	KME	-Y	DCML	ER	59		
ASP-1N	27	CNSSG	--	IT	DKDRQAF	LD	FHN	NARR	AKG	VE	EDS	--	NSGKL	NPAK	NMY	KLS	-WDC	AME	Q	80	
ASP-1C	9	CPSNT	-GM	TD	SVR	DT	FLS	VHNE	FRSSV	ARG	LEP	D	--	ALG	GNAPKAA	KMV	-Y	DCE	VEA	64	
VAP-3	14	CSADFG	--	SSGQNG	I	NAHNTL	RSKI	AKG	TYVA	--	KGT	QKSPG	TNLL	KMK	-WDS	AVAA	66				
MSP-1	15	ITYTVVNSLT	V	PEQNAV	WDCI	ANGK	TKN	--	KNG	NFPSGKD	I	LEV	S	-YSK	DLEK	71					

To Fig.3-2

FIG. 3-2

FROM Fig. 3-1

VAP-1N	77 KAQEWA[D]GCPSSFQT--FDPT--WGQNYATYMGSI--ADPLPYASMA[V]NGWW[SE]IRTVG	129
VAP-1C	71 NARTWA[K]GCLYQH[ST]SAQRPG---LGENLYMISINN--MPKIQTAEDSSKAWWSELKDFG	125
VAP-2N	115 LAA[NW]STS[CPQHFM]PQSVLGS---NAQLFKRFYFYFDGH[HD]STVHMRNA[M]KYYWWQQGEE[KG	171
VAP-2C	60 FAQ[NW]ANNCVFA[HS]AHYERPN---QGQNLYMSSFSN--PDPRSLIHTAVEKWWQELE[EE]FG	114
ASP-1N	81 QLQDA1QSCPSAFA[G]---I[QG]---VAQNVMWSWSSGGFPDPSVKEQTL[SGWWSGAKKNG	134
ASP-1C	65 SAIRRHG[K]CVYQH[SHGEDRPG---LGENIYKTSVLK--FDKNAAKQA[SQLWWN]ELKEFG	119
VAP-3	67 SAQNYANGCPTGHSG---DAG---LGENLYWYWTSGSLGDLNQYGSAASASWEKEFQDYC	120
MSP-1	72 SAQRWANKCIFDHNGTDLYSGGKFYGENLYLDGDFEH-KNITQLMIDACNAWWGE[STTDG	130

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VAP-1N	130 LTD---PDNK---YTNSA---MFRFANMANGKASAFGCA[YL]CAGKL---S[INCI]172	
VAP-1C	126 VGSD---N[LT]TQA---VFDRG---VGHYTQMAWE[GTTE]IGCFVENCPTFT-----YSV[Q]171	
VAP-2N	172 NEDQ---KNR---FYARRN---YFGWANMA[K]GKT[YRVGCSYIMCGDGE[-----ALFTCL217	
VAP-2C	115 TPD---NV[LT]PE---LWDLKGKA[GHYTQMAWDRTYRLGCCIANCPKMS-----YVYCH163	
ASP-1N	135 VGPD---N[-----KYNGG---LFAFSNMVYSETT[KL]GCA[YKVCGTKL-----AVSC[176	
ASP-1C	120 VGPS---NV[TTA]---LWNRPGMQI[GHYTQMAWDTTYKLGCA[VFCNDFT-----FGV[Q]168	
VAP-3	121 WKS---NLMTID---LFNTG---GHATQMAWA[KSNLIGCGVKDGRDSNGLNKVTVV[Q171	
MSP-1	131 VPPSWINNFLPTDNKENDEKFEAVGHWTQMAWA[KTYQIGCALKVCHKPDCNGN--LIDCR188	

To Fig. 3-3



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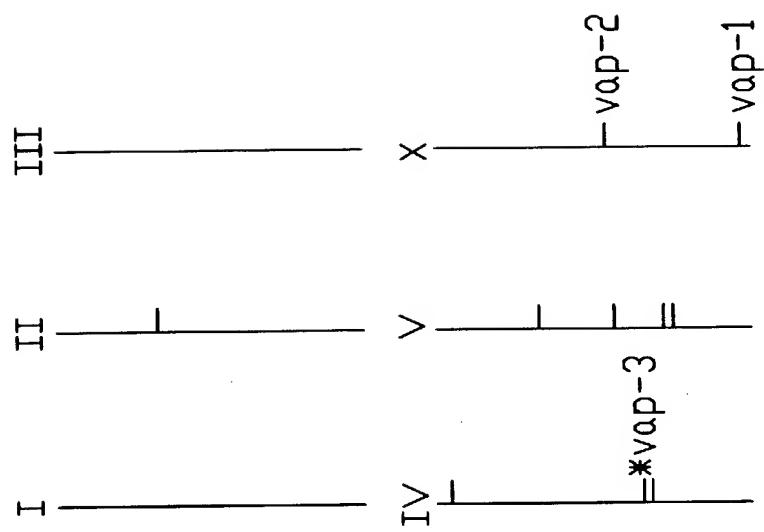
FIG. 3-3

FROM Fig. 3-2

VAP-1N	173	Y N K I G Y M T N A I	Y E K G D A C T S D A E C T T Y S -- D S Q C K N G L C Y K A -- -- -- 213
VAP-1C	172	Y G P A G N Y M N Q L I	Y T K G S P C T A D A D C P G T Q -- T C S V A E A L C - V -- I P -- -- -- 212
VAP-2N	218	Y N E K A Q C E K E M I Y E I	Y E N G K P C C E D K D C F T Y P G S K C L V P E G L C Q A P S M V K D D G G 268
VAP-2C	164	Y G P A G N R K N N K I Y E I	Y G D P C E V D D D C P I G T -- D C E K T T S L C - V -- I S K -- -- -- 205
ASP-1N	177	Y N G V G Y I T N Q P M W E T	T G Q A C K T G A D C S T Y K -- N S G C E D G L C T K G P -- -- -- 218
ASP-1C	169	Y G P G C N Y M G H V I Y T M G Q P C S	Q C S P G A -- T C S Y T E G L C - S -- A -- P -- 206
VAP-3	172	Y K P Q G N F I N Q Y I Y V S G A T C S	G C P S G T -- S C E T S T G L C V -- -- -- 207
MSP-1	189	Y Y P G G N G M G S P I Y Q Q G K P A S	G C G K A G -- P S T K Y S G L C K P D P H Q N N -- 231

FIG. 4

Schematic map of selected *C. elegans* *vap* genes



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FIG. 5A

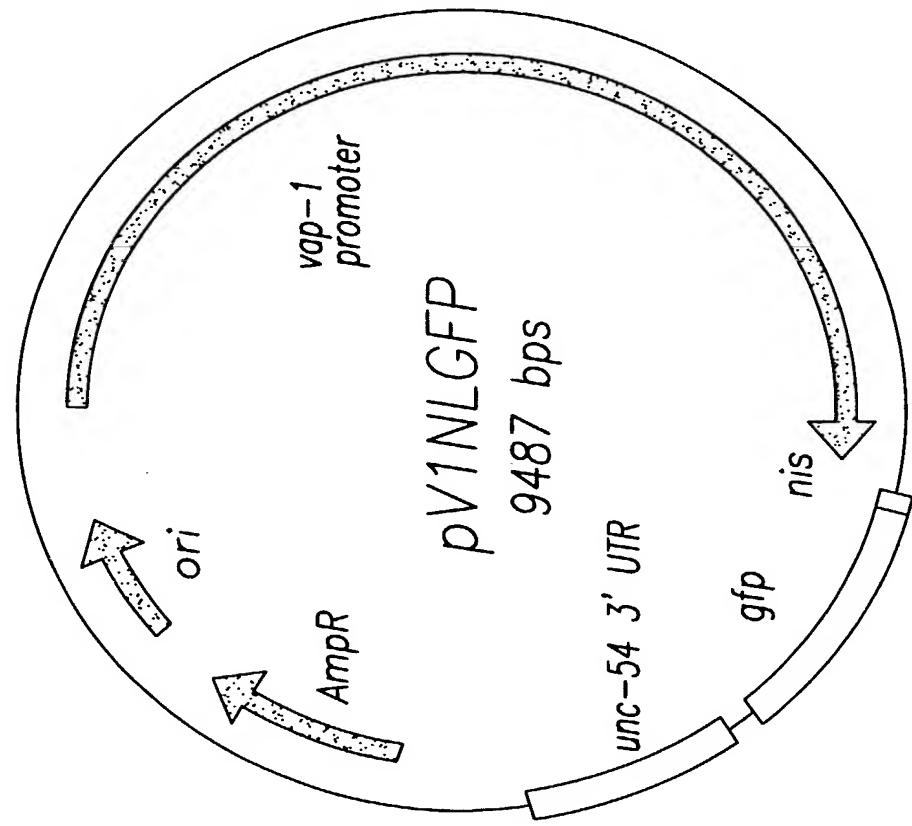
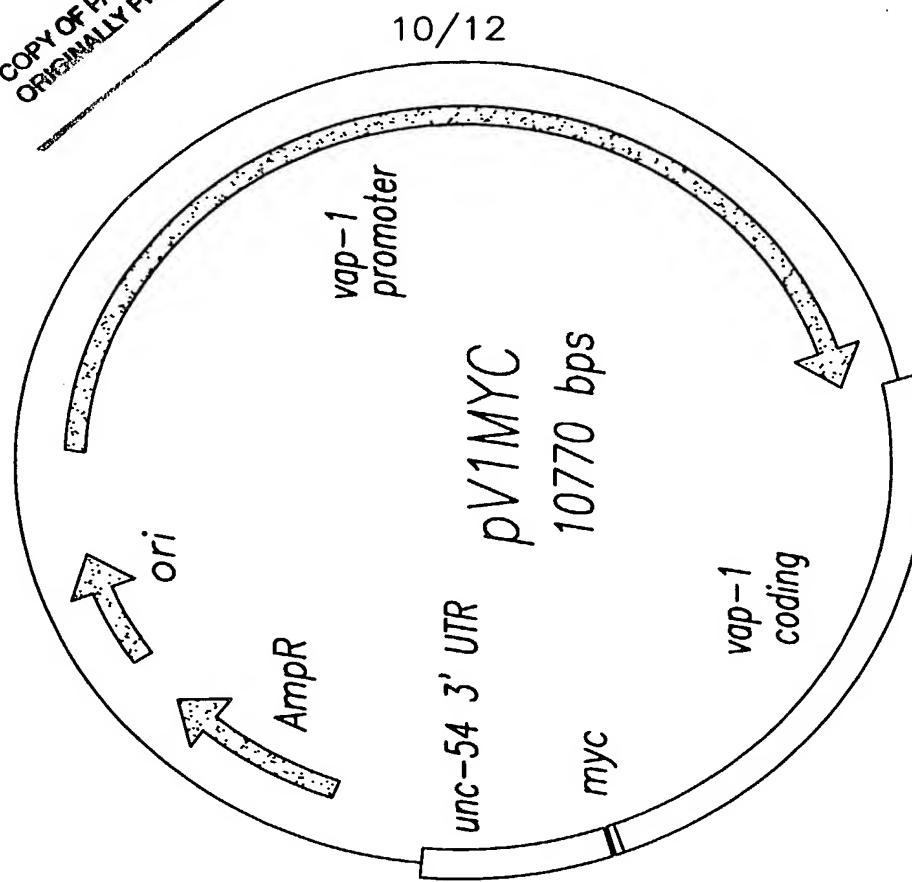


FIG. 5B



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FIG. 6A

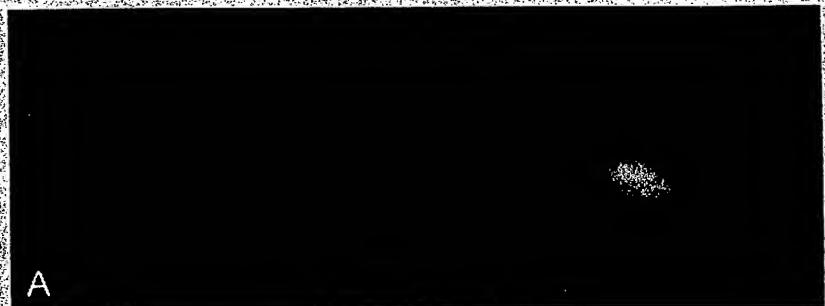


FIG. 6B

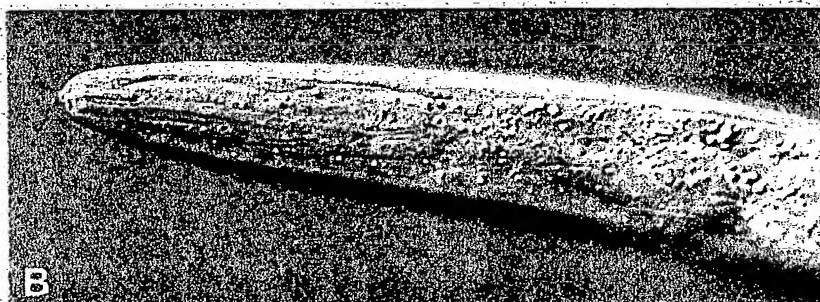


FIG. 6C





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FIG. 7

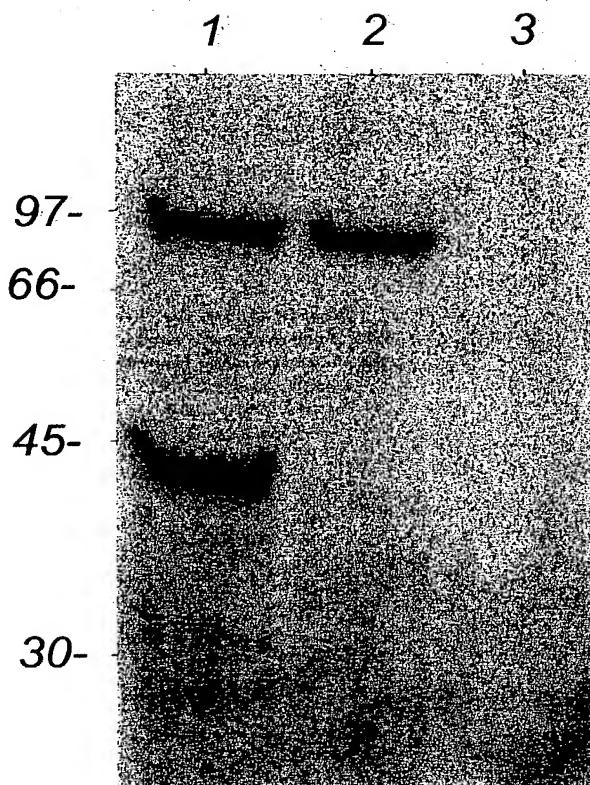


FIG. 8

